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ROBUSTNESS OF THE LOGISTIC STRATEGY FRAMEWORK IN POST-COVID-19 ENVIRONMENT: AN EMPIRICAL STUDY OF INDIAN ENTERPRISES

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Abstract:

Although testing the Bowersox and Daugherty (B&D) (1987) typology in international markets have provided valuable insights into the model's relevance in logistics, literature has not re-examined the B&D model's effectiveness during the post-pandemic business environments. The current research examines the robustness of the B&D logistics strategy framework during the post-COVID-19 Indian market environment. Using a structured questionnaire, the data for this study (n=372) was collected from the executives whose main job responsibility was related to distribution/logistics decisions in micro and small-sized (MSEs) manufacturers in India. Based on the conceptual relationships identified in the B&D typology, we used structural equation modeling to test the study hypotheses. Results show that overall logistics strategy comprised of three strategic priorities positively influences firms' competitive responsiveness through the logistics coordination effectiveness and customer service commitment route, supporting the robustness of the model in the post COVID-19 environment. Effective logistics strategy does not occur in isolation. Emphasis in coordination and customer service must occur for a well thought out logistics strategy (process, market, and information orientation) to improve organizational competitive responsiveness in the context of Indian MSEs. This study contributes to the literature by providing empirical support for the validity and the robustness of the B&D logistics strategy model during the post COVID-19 environment in an emerging market.

Key words: *Logistics strategy, B&D typology, Micro and small enterprises, post COVID-19*

1. Introduction

Logistics strategy is an essential component of an organization's corporate strategy (Heskett, 1977) and involves processes of managing material, service, information, and capital flows from the source, through the firm and to the customer. To achieve efficiencies

at a global scale, organizational interdependence, collaboration, technology adoption, and coordination were needed in unlike environments of the global markets. Accordingly, a firm's ability to manage logistics across country environments has become an important core organizational competency. While globalization offers significant opportunities for MNCs to shift their manufacturing and distribution around the world especially in developing and emerging markets, global manufacturing strategies alone may not be effective if they are not supported by the successful logistics strategies. However, the fragility of global supply chain (GSC) was brought to forefront during COVID 19 (Paul and Chowdhury, 2020). COVID-19 played havoc with all walks of life and unlike past disasters or pandemics, it severely impacted GSC (Xu, Elomri, Kerbache, & Omri, 2020). Further, such outbreaks have negative, lasting impact on businesses and their operations, necessitating effective recovery techniques (Koonin, 2020). Therefore, to sustain themselves in the competitive environment, organizations have developed strategies to strengthen their global supply chain to thwart any such disruptions (Ivanov and Das, 2020).

The Bowersox and Daugherty (1987) typology (B&D, hereafter) has been a popular conceptual framework used in studying logistics strategy. B&D typology considers three critical dimensions of organizational logistics orientation (process, market, and information focus) which could be adopted either individually or collectively to respond to the competitive environment. Accordingly, the logistics strategy is one of the major research categories in the evolution of logistics thought and practice (Goldsby et al., 2019) it has moved beyond simple integration of the various functions such as transportation, inventory, and warehousing, to become characterized by the dimensions of logistics strategy. When the dimensions of overall logistics strategy (OLS, hereafter) are coordinated well, organizations are then assumed to achieve higher levels of competitive responsiveness. Literature provides substantial evidence on the adoption of B&D typology in the US and around the world (Casaca and Marlow, 2009, McGinnis, 2011, and Ahmed Attia, 2014). These studies have shown that the B&D typology can be used in the United States as well as in several other countries with different cultural backgrounds and economic development levels. Since the introduction of B&D typology, studies have shown that (Kohn et al, 2011, McGinnis et al, 2013) the positive effect of OLS on firm competitive responsiveness is further enhanced when the relationship is mediated by effective logistics coordination and customer service.

Although the empirical results supporting this relationship have been confirmed by many studies in different time periods (Spillan et al, 2013) for different business sizes (Kohn et al, 2011; Luo, 2001), and in different country environments (Attia, 2014; Mellat-Parast, and Spillan, 2014) this model has not been tested after the uncertain environments created by the COVID-19 pandemic. The Pandemic has introduced unexpected supply chain disruptions due to rigid restrictions placed on human and business activities around the world. The chain reaction caused by the policy decisions by various governments around the world has exposed the fragility, vulnerability, and resiliency issues of the global supply chains. Businesses have recognized that they need to rebalance efficiency and resiliency to be able to operate in unexpected environments created by the pandemic (Fonseca and Azevedo, 2020). During such challenging times, resilience and responsiveness are key drivers enabling the firms to deal with disruptions.

To close the gaps in the literature, Kara's et al., (2023) recent study demonstrated that CSC levels declined. This was considered one of the trade-offs that was made during COVID-19 environment. They explained that this was mostly related to organizations' inability to meet existing service commitments and customers' expectations due to severely strained resources. At the same, since previous literature provided strong empirical support for the B&D framework, as the conditions of the uncertain environment which was caused by the pandemic changes (e.g., returns to near normal), one would expect that the previously validated effects of the B&D dimensions through the mediated variables on competitive responsiveness should also hold.

This current study attempts to address that gap in the literature by attempting to re-validate the B&D framework during the post-COVID-19 environment in Indian business environment. Although previous attempts of testing the B&D typology in international markets have provided valuable insights into the model's relevance during the pre-COVID-19 environment, the scholars have not re-examined the B&D model's effectiveness among the post pandemic-business environments. The Indian business context provides a unique environment to re-validate the conceptualized relationships. It offers several insights because it is one the largest economies in world and is an integral part of the global supply chain system. Moreover, India was ranked second in the 2022 Agility Emerging Markets Logistics Index (www.agility.com, 2022), which compares countries based on their domestic and international logistics opportunities, business fundamentals, and digital readiness. Finally, support for the US-India economic integration agreement had gained speed, which seeks to grow manufacturing and resilient supply chains in India.

2. Post Covid-19 Pandemic Logistics Environment

Most regions of practically all worldwide economies have seen a decline in economic activity because of COVID-19. Compared to their industrialized counterparts, emerging countries face a different set of supply chain difficulties. The global effects include the suspension of international commercial flights, the closure of malls, and the closure or cancellation of schools and institutions (Al-Mansour and Al-Ajmi, 2020). Nearly every industry has been affected by the supply chain ripple. While being extremely harmful, COVID-19 activates fluctuations in both supply and demand. Remko (2020) and Golan et al. (2020) note that throughout this outbreak, supply networks encountered a lack of preparedness, flaws in their response strategies, and a requirement for improved supply chain resilience.

As the effects of the pandemic subsided and companies moved past COVID-19, they need to adopt and develop supply chain disruption strategies by utilizing dynamic capabilities that result in supply chain resilience. Organizations have to manage supply chain interruptions with the use of supply chain resilience tools, in order to ensure operational excellence (Mishra et al., 2021). A number of recent COVID-19-related research studies have shown that strengthening supply chain flexibility mechanisms is crucial for reducing supply chain-related difficulties (Belhadia et al., 2020, Ketchen and Craighead, 2020, Queiroz et al., 2020). Enhancing supply chain's ability to mitigate disruptions is essential to reducing the problems the COVID-19 outbreak has caused in daily operations (Belhadia et

al., 2020, Ketchen and Craighead, 2020, Queiroz et al., 2020). The foundation of supply chain resilience resides in a collection of skills sets and planning functions that allow businesses to maintain and improve their operations in order to maintain its competitive positions in the market (Birkie and Trucco, 2020). The ability of an organization to modify, revise, and reconfigure its internal and external resources and capabilities in response to the quickly changing environmental conditions is highlighted by its dynamic capability view (Teece, 2007). Supply chain managers will have to continuously prepare for these uncertainties and seek out effective strategies for mitigating any disruption that they encounter.

3. Literature Review

In 1987, Bowersox and Daugherty completed a comprehensive study of logistics strategy integration. Their research focused on three distinctly different logistics strategy orientations that firms have used in their decision-making. Process Strategy refers to managing flows to gain control over activities that lead to cost increases (may be referred to as “cost drivers”). Market Strategy focuses on reducing the complexities faced by customers. This may be achieved in various ways such providing a single point of contact for customers to source multiple products from different divisions, or facilities, of the same firm. Information Strategy aims to coordinate information flow throughout the distribution channel to facilitate cooperation and coordination among supply chain participants.

Although the B&D framework was introduced more than three decades ago, it has attracted significant researcher and practitioner interest over that time. Several studies conceptualized the three-dimensional logistics strategy together would constitute an organization's Overall Logistics Strategy (OLS) and provide a basis for assessing logistics/supply chain management strategy decisions on firm competitive responsiveness (Kohn et al., 2011). In addition, scholars (McGinnis et al., 2011) concluded that logistics strategies were present in both small and large firms, regardless of their sizes. Furthermore, other studies have investigated the applicability of the B&D typology in different cultures (Spillan et al., 2018; McGinnis et al., 2011; McGinnis et al., 2012a, 2012b; Spillan et al., 2013). These studies concluded that the Overall Logistics Strategy (measured by three dimensions) on firm competitiveness (COMP) was also applicable in unlike environments of the international markets confirming the role of two mediating variables (LCE and CSC). Table 1 shows a select number of published articles on logistics strategy during the last decade. Most of them show that B&D model has been an influential conceptualization in logistics strategy research.

Table 1 shows that literature provides variety of approaches to logistics strategy, but one could mainly categorize them into two broader groups: (1) data determined and empirically derived numeric taxonomies and (2) conceptual or theoretical perspectives. Earlier contributions by Closs and Clinton (1997), Kohn and McGinnis (1997a), and Bowersox et al., (2000) continue to provide strong foundation for several current logistics strategy research. In other words, the B&D model continues to attract significant researcher interest as the researchers focus on understanding the role of constantly changing business environments. Although the B&D model continued to attract researcher interest, additional

studies re-evaluating its effectiveness in constantly changing business environment are justified. Re-evaluation of the typology in rapidly changing globalized business environment, where unexpected pandemic outbreak burdens the supply chains would be beneficial to understand if the typology needs adjustments from both theoretical and practical perspectives.

Table 1. Comparison of selected logistics strategy studies

Authors	Background	Methodology	Findings
McGinnis, Kohn, and Spillan (2010)	Studied logistics strategy from 1990 to 2008.	Compared empirical data gathered in 1990, 1994, 1999, and 2008.	Concluded that cost efficiency is common to both strategy clusters, that reducing complexity faced by customers and inter- and intra-organizational coordination is less important in passive logistics strategies.
Kohn, McGinnis, and Kara (2011)	Assessed the relevance of the three dimensions (process strategy, market strategy, and information strategy) to logistics strategy and organizational competitiveness.	Compared empirical data gathered in 1990, 1994, 1999, and 2008.	Reported that if the process, market, and information concerns are coordinated within the OLS to the extent that logistics coordination is effective, and there is and a clear focus on customer service will strongly contribute to overall organizational competitive responsiveness.
McGinnis, Kara, and Wolfe (2016)	Offered a generalized framework for Logistics Management Strategy	Used a systematic review of the literature on logistics strategy empirical research	Concluded on the dimensionality of the B&D typology and mediating factors of Logistics Coordination Effectiveness and Customer Service Commitment.
Fabbe-Costes and Colin (2017)	Offered a conceptual framework for logistics strategies by using six generic strategic formulations for logistics strategies	Conceptual study by adopting cost domination, differentiation, innovation, alliance, expansion of profession, diversification.	Concluded that firms formulate their strategies based on environment reactively or proactively.
Gruchmann and Seuring (2018)	Main components of framework considered are logistics resources, sensing and sizing, and dynamic capabilities.	Used case studies to assess the conceptual framework.	Concluded that the degree of homogeneity across logistics services hinders a sustainable advantage in the long run and demands for more advanced logistical capabilities.
Shin, Thai, and Yuen (2018)	Examined the role of relationships quality on performance.	A survey of 205 maritime logistics service players	Trust and commitment influenced supply chain performance.
Moller et al., (2020)	Offered a taxonomy of optimization and visibility services for logistics	Used a database of start-ups.	Examined five dimensions of data driven business models (value proposition, service platform, interface, organizing and revenue models) and concluded that characteristics of the taxonomy are not mutually exclusive.

Bag, Gupta, and Luo (2020)	Examined the effects of technological, organizational, and environmental capabilities on logistics strategy and firm performance.	An online structured survey questionnaire was used to collect data from 230 respondents.	Found that technological, organizational, and environmental capabilities had significant effect on logistics capabilities, which in turn had significant effect on firm performance.
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Logistics Environment in India

Globalization in India has produced a local market sector that relies substantially on supply chain functions to meet the needs of its customers (Gurumurthy et al, 2013). With the global pandemic as a backdrop, the Indian logistics and supply chain businesses were transformed from a support sector to a high impact sector. Despite the fact that the pandemic and the widespread vaccination effort forced the industry to change quickly in order to address the many hurdles, it is now poised to make a significant leap. The local sector is now a leader and significant force behind not only domestic and international trade but also the lifeline of smaller businesses, start-ups, and entrepreneurs. Logistics and supply chain management have benefited from the expansion and popularity of e-commerce, as well as from more affordable data connections and less expensive mobile phones. Industry experts forecast that during the next few years, the sector will rise by 9–10%. Today, India has become the world's top location for logistic service providers and has a promising future in effective logistics activities.

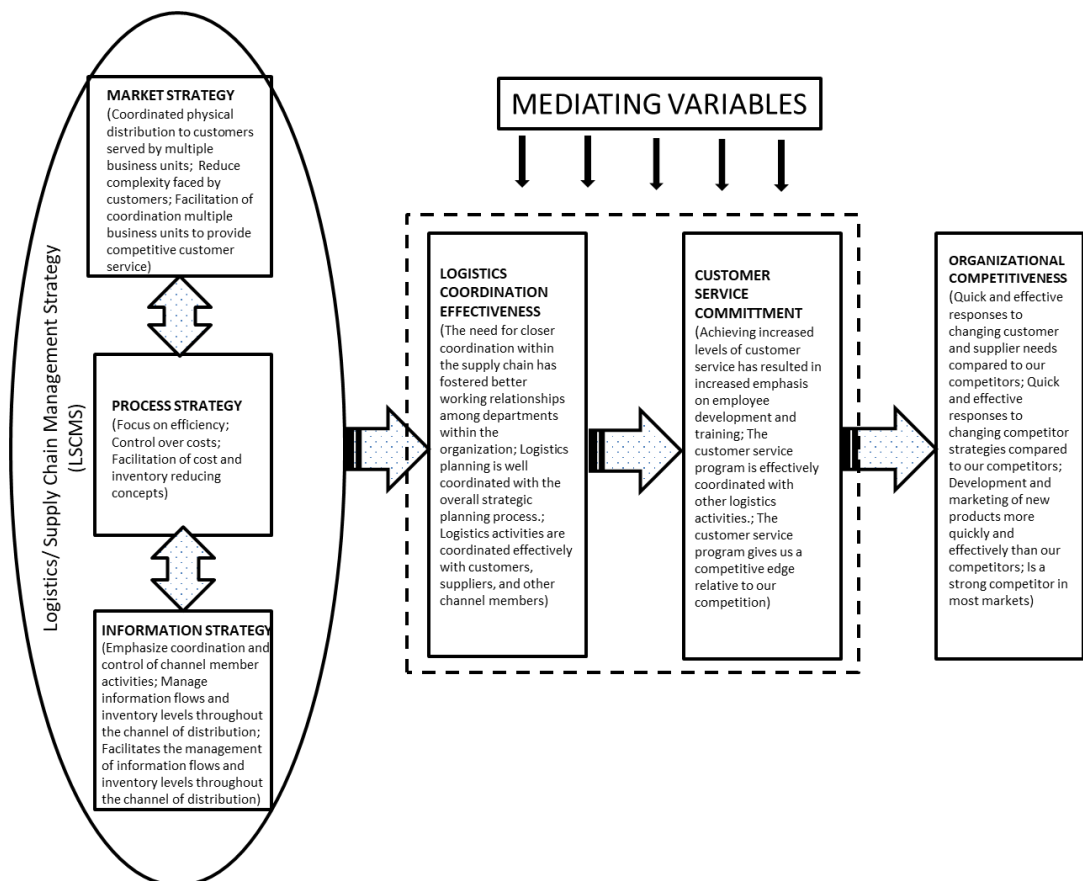
India's logistics industry has become more well-known as a result of growing national consumption and India Inc.'s commitment to improving last-mile delivery efficiency. Due to increased digitization, the adoption of international best practices, and the industry's growing importance in the economy, has moved the sector to a top employer of choice. However, for a long time, the Indian supply chain industry has faced significant obstacles due to limited infrastructure, expensive raw material, labor, and energy costs, poor risk management, inept personnel, and a lack of effective tech support. To ensure efficient coordination across all segments of the supply chain, from sourcing and manufacturing to reaching the endpoint — the client — firms must integrate IT with supply chain and logistics to satisfy customer expectations. Maintaining a balance between supply and demand in the economy requires effective supply chain management (Pereira, Sandeep (2021). The transportation industry currently controls over 85% of the value of Indian logistics, and it is anticipated that this percentage will stay high for the foreseeable future. Nevertheless, the sector faces its own particular difficulties in India, such as: (1) the presence of multiple unorganized competitors, the sector is fragmented; (2) organized players control 10% of the entire market share; (3) India's infrastructure and transportation connectivity problems are frequently attributed to a multitude of legislative obstacles and (4) limited material handling techniques, dispersed warehouses, and insufficient infrastructure make storage a problem for perishable goods.

4. Conceptual Model and Hypotheses

Using the B&D typology, previous studies provided a framework for the relationships among various constructs. We adopt the view that the overall logistic strategy may be conceptualized as a three-dimensional construct (process, market, and information strategy). In addition, two mediating variables, logistics coordination (LCE) and customer service commitment (CSC) are critical in understanding the effects of logistics strategy on organizational competitiveness. The conceptual model used in this study is displayed in Figure 1.

We argue that logistic strategy is a significant predictor of a firm's competitiveness (Mellat-Parast & Spillan, 2014). We estimate that the previously supported mediating relationships will hold again in the post-pandemic environment as the uncertainty caused by the pandemic diminishes and supply chains start to normalize. Therefore, we hypothesize that the overall logistics strategy complemented by higher levels of logistics coordination and customer service commitment will affect the firm's competitiveness. As such, we posit that:

Figure 1. Conceptual Model Post COVID-19 Environment



Source: Adapted from Kara et al., (2023)

Hypothesis 1: Overall Logistics Strategy (OLS) positively influences Logistics Coordination Effectiveness (LCE) in Indian micro and small-sized (MSEs).

Hypothesis 2: Logistics Coordination Effectiveness (LCE) positively influences Customer Service Commitment (CSC) in Indian micro and small-sized (MSEs).

As mentioned earlier, literature provides support for the relationships identified in the conceptual model but the role of the CSC during the COVID-19 pandemic was reported to be not significant. The pandemic environment caused by the coronavirus has impacted customer service and support delivery substantially (Quaglietta and Alvord, 2020). Researchers argued that continuity of operations in the supply chains has been threatened by increased absenteeism of participants, management, and support staff due to lockdowns and fears. The unknowns of the working conditions have been further exasperated by anxiety, low morale, and employee retention. Moreover, customer uncertainty and confusion led to increasing demand for customer service and support. Although one could argue that these conditions should have been planned under the disaster recovery and crisis management/planning, the enormously larger scope and the scale of the unexpected system failures led to massive disruptions. In their study, Vokurka and Lummus (2003) argue that for most supply chains, a balance must exist between customer service requirements and supply chain capabilities. Hence, in an extraordinary time, such as the environment created by the pandemic, marketing initiatives, especially customer service commitment, need to be evaluated considering costs and overall supply chain performance. When the supply chain is incapable of delivering customer service expectations, marketing programs that add to an imbalance in the supply chain must be evaluated and adjusted. In this study, we hypothesize that CSC will have a positive effect on organizational competitiveness as the pandemic conditions diminish. Therefore, we offer the following hypothesis:

Hypothesis 3: Customer Service Commitment (CSC) positively influence Company/Division Competitive Responsiveness (COMP) in Indian micro and small-sized (MSEs).

5. Methodology

5.1. Dimensions of Logistics Strategic Orientations

Measurement scales used in this study have been adapted from the extant literature and are assumed to have sufficient reliability and content validity (Kohn and McGinnis, 1997; George and Mallery, 2003). Specifically, Bowersox and Daugherty (1987) suggested the existence of three critical dimensions of logistics/supply chain management strategic orientation. These dimensions may be used separately or in combination with the other dimensions to achieve organizational competitiveness. The dimensions included in the BD framework are (1) process strategy, which mainly involves the management of traditional logistics activities with the primary goal of controlling costs, (2) market strategy, which is mainly involved with the management of traditional logistics activities across business units to reduce the complexity faced by customers, and (3) information strategy or channel strategy, which involves managing a diverse group of logistics activities as a system to achieve inter-organizational coordination and collaboration through the channel. This

framework suggests that process, market, and information strategies need to be coordinated as a business logistics strategy to achieve better organizational competitiveness.

5.2. Study Questionnaire

To operationalize the constructs in the conceptual model, we adopted the measurement scales from the McGinnis et al., (2010) study. The study questionnaire consisted of three different sections. The first section of the questionnaire included scale items related to the logistic strategic orientations, as conceptualized to consists of process, market, and information strategies. Nine scale items, three statements for each dimension have been adopted from the Bowersox and Daugherty (1987) study. Each construct in this study was modeled as a latent variable and measured by a five-point Likert scale, where 1=Strongly Disagree to 5=Strongly Agree. These dimensions were then collectively used to form a second order construct, overall logistics strategy.

Previous studies suggested that the effect of the overall logistics strategy on firm competitiveness improved when the relationship is mediated by Logistics Coordination Effectiveness (LCE) and Customer Service Commitment (CSC) constructs. Hence, the second section of the questionnaire included six items to operationalize these constructs. In addition, we used three items to measure the Company/Division Competitive Responsiveness (COMP). All scale items used a five-point Likert scale, where 1=Strongly Disagree to 5=Strongly Agree. After considering issues of validity and reliability, occurrence of scale replication, consistency of sampling and data collection methodologies, and the lack of relevant post COVID-19 data on logistics strategy, we concluded that these six constructs selected for this research would provide a useful basis for validation of relationships among logistics strategies and their implications in significantly disrupted distribution environment companies experienced two years after the pandemic.

The last section of the questionnaire included statements about private warehousing decisions along with some demographic information about the study participants and their organizations. Original questionnaire was developed in English and had been tested in the literature. Similarly, we used English questionnaires in this study as the subjects targeted in India, especially at the managerial levels, are fluent and well versed in English, hence no translation was made in the original questionnaire. The questionnaire was pre-tested with a small group of participants before data collection. The results were satisfactory concerning the meaningfulness and the applicability of the questions in the country's environments.

5.3. Data collection

The data for this study was collected across India during the summer of 2022. A questionnaire used in previous research with minor modifications to suit the Indian context was employed to collect the data. Hence, adoption of the existing scale items from the literature reduced the concerns related to content validity and reliability of the scales, since they were previously established and tested in the earlier studies. A group of management students collected the data under the supervision of one of the co-authors. The students were briefed and trained before they were sent out to collect data using personal interviews.

They were given incentives in the form extra credit towards their grade for their efforts in the data collection process.

We specifically targeted the micro and small-sized (MSEs) manufacturers in India, since they have limited resources and would be more severely affected by the supply chain disruptions the pandemic caused and perhaps were able to quickly adapt to the environment after the pandemic. We used personal connections along with help from the Chambers of Commerce to identify the MSEs for data collection. The participants chosen for this study were managers or executives who were actively involved in distribution/logistic decisions in their organizations. They were contacted in person or online, and prior appointment/permission was obtained from them. Among the four-hundred-and-fifty contacts that have been made, eighty-two people declined to participate in the survey. As a result, a total of $n=372$ responses were used in the statistical analysis.

6. Analysis and Results

Descriptive analyses of the data show that most of the respondents were affiliated with a non-corporation (Partnership or Private Ltd., 79%) organization type, and they were identified as “owner” or “manager” (78%). More than 90% of the participants had a bachelor’s degree or higher, and based on the OECD classification, most of the companies (78%) represented in the sample would be considered micro and small-sized enterprises (MSEs) based on the number of employees (less than 50 full-time employees). In addition, more than three-quarters of the companies had annual earnings of less than \$1.5 million.

6.1. Construct Reliability & Validity

We first checked the reliability of the constructs used in the study (Table 2). Reliability scores obtained in this study were mostly in line or marginally below the levels suggested (0.70) in the literature. However, some of the previous studies (e.g., Kohn et al., 2013) had also reported weak reliability scores for especially LCE and CSC. Therefore, we considered the construct reliability scores obtained in this study are consistent with the previous studies reported in the literature.

6.2. Exploratory and Confirmatory Factor Analysis

To assess whether the correlation among variables is suitable for factor analysis, we used exploratory factor analysis and examined the Kaiser-Meyer-Olkin measure of sampling adequacy (Kaiser, 1970). EFA showed that a single factor loading for all nine statements for logistics strategy for process, market, and information strategy with an explained variance of 51%. The value of KMO-MSA was 0.907, indicating the data were appropriate for factor analysis. All KMO results were above .50, which is the minimum cut off for factor analysis. Additionally, all levels of significance for Bartlett’s test for sphericity were less than .001. The KMO and the Bartlett results indicate the data is suitable for factor analysis.

To confirm the underlying factor structure of the overall logistics strategy, we conducted a confirmatory factor analysis. We used various goodness-of-fit indices to assess model fit including the χ^2 statistic, comparative fit index (CFI) goodness-of-fit index (GFI), and the root mean square error of approximation (RMSEA). Results of CFA show that the underlying factor structure of three constructs yielded good fit (Figure 2).

As conceptualized, three logistic strategic priorities of PROCSTR, MKTGSTR, and INFORSTR and a higher order construct called overall logistics strategy (OLS). The results of the estimation of the first order factor model revealed very strong results as indicated by several different measures ($\chi^2= 69.39$, $p<.00$; GFI=0.96; CFI=0.963; RMSEA =0.07).

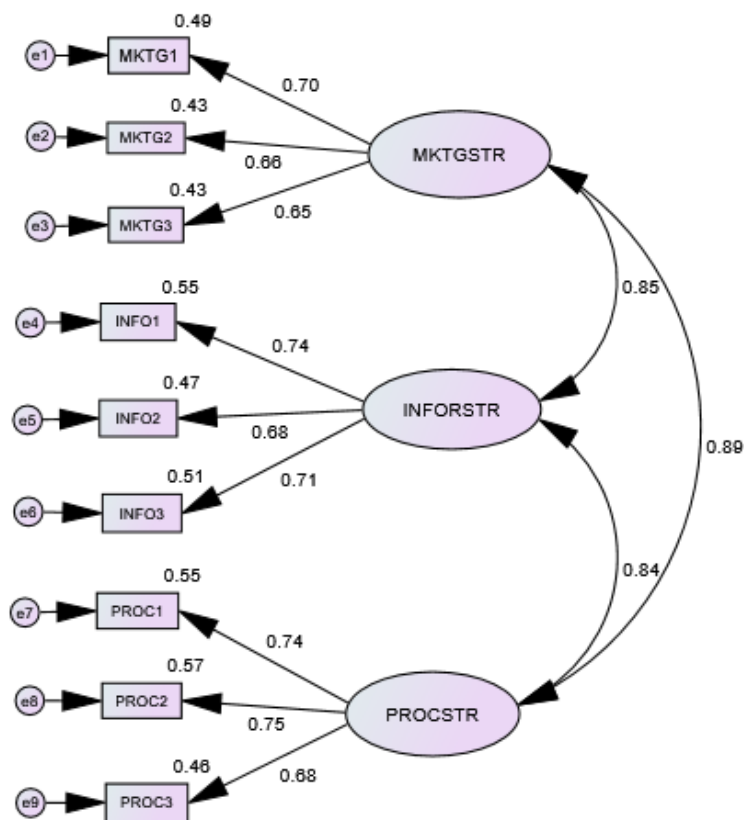
Table 2. Construct Reliabilities

Scales/Items*	Cronbach Alpha
Scale 1: Process Strategy (PROCSTR)	
1. In my company/division, management emphasizes achieving maximum efficiency from purchasing, manufacturing, and distribution.	.76
2. A primary objective of logistics in my company/division is to gain control over activities that result in purchasing, manufacturing, and distribution costs.	
3. In my company/division, logistics facilitates the implementation of cost and inventory reducing concepts such as Focused Manufacturing and Just-in-Time Materials Procurement	
Scale 2: Market Strategy (MKTGSTR)	.71
1. In my company/division, management emphasizes achieving coordinated physical distribution to customers served by several business units.	
2. A primary objective of logistics in my company/division is to reduce the complexity our customers face in doing business with us.	
3. In my company/division, logistics facilitates the coordination of several business units to provide competitive customer service.	
Scale 3: Information Strategy (INFOSTR)	.76
1. In my company/division, management emphasizes coordination and control of channel members (distributors, wholesalers, dealers, retailers) activities.	
2. A primary objective of logistics in my company/division is to manage information flows and inventory levels throughout the channel of distribution.	
3. In my company/division, logistics facilitates the management of information flows among channel members (distributors, wholesalers, dealers, retailers).	
Logistics Coordination Effectiveness (LCE)	.61
1. The need for closer coordination with suppliers, vendors, and other channel members has fostered better working relationships among departments within my company.	
2. In my company, logistics planning is well coordinated with the overall strategic planning process.	
3. In my company/division, logistics activities are coordinated effectively with customers, suppliers, and other channel members.	
Customer Service Commitment (CSC)	.53
1. Achieving increased levels of customer service has resulted in increased emphasis on employee development and training.	
2. The customer service program in my company/division is effectively coordinated with other logistics activities.	
3. The customer service program in my company/division gives us a competitive edge relative to our competition.	
Company/Division Competitiveness (COMP)	.65
1. My company/division responds quickly and effectively to changing customer or supplier needs compared to our competitors.	
2. My company/division responds quickly and effectively to changing competitor strategies compared to our competitors.	

3. My company/division develops, and markets new products quickly and effectively compared to our competitors.

*Scales: 1 = Strongly Agree, 2 = Agree, 3 = Neither Agree nor Disagree, 4 = Disagree, 5 = Strongly Disagree. See COMP-4 for that variable's scale.

Figure 2. Confirmatory Factor Analysis



Chisquare=69.394, p-value=.000, GFI=.960, CFI=.963, RMSEA=.071

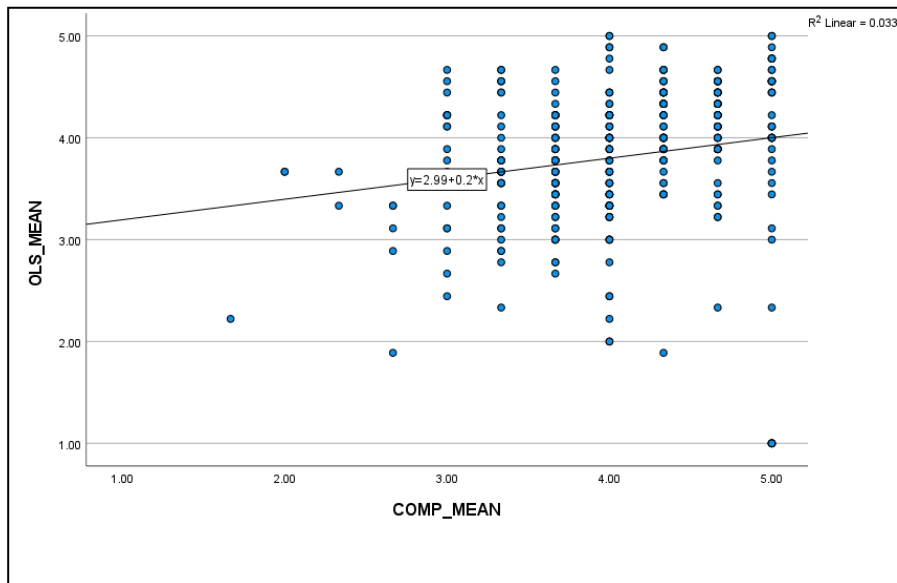
Accordingly, the results showed that all loadings in the model were significant, leading us to conclude that the relationships between the items and latent factors were confirmed. Hence, we can conclude that dimensionality of the BD typology of process, market, and information strategies hold among MSEs in India after the pandemic environment.

6.3 Hypotheses Testing

Prior to testing the effects in our conceptual model in Figure 1, we generated a scatter plot to examine the relationships between the key variables of the study – OLS and

COMP. Since all the scales had reasonably high reliability scores, using the mean values of these measures are acceptable to represent each construct. This cursory analysis reinforces our contention that the proposed hypotheses are indeed in the data and not generated by the construction of the indicators and the model. Figure 3 shows a visible positive relationship between OLS and COMP.

Figure 3. Scatter Plot



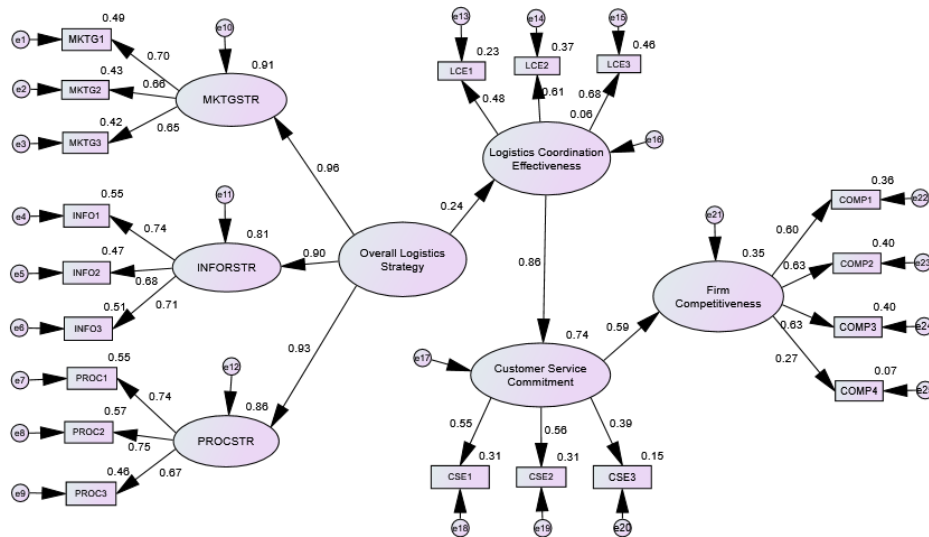
6.4. Structural Equation Model

To test relationships among the constructs displayed in the conceptualized model, we first ran a structural model analysis linking OLS directly to the COMP. Analysis results showed that OLS x COMP path was significant with an explained variance (r-square) for the model of 0.05, indicating that only a small portion of the variance in the COMP was explained by the OLS. We then included the two mediator variables, LCE and CSC, to assess the conceptualized structural model assesses the relationships among six constructs as discussed in the conceptualization section earlier. Figure 4 displays standardized path coefficients for the paths and the model r-square values for the constructs.

The model fit values obtained for the structural model meets the cutoff values recommended in the literature (GFI= 0.943; CFI=0.958; RMSEA= (0.04). R-square value was 0.33 for the overall model, indicating a good portion of the variation in firm competitiveness was explained by the structural model tested. After including the mediator variables, the direct path from OLS to COMP became statistically insignificant, indicating the full mediation roles of LCE and CSC. All path coefficients in the model were statistically significant as they were hypothesized for the post COVID-19 pandemic environment. That is, the Overall Logistics Strategy (OLS) comprised of process, market, and information strategic priorities impacts firms' competitive responsiveness through the logistics coordination effectiveness (LCE) and customer service commitment (CSC) route, supporting

all H1 and H2. Hence, we can report that OLS, LCE, and CSC all together positively influenced the competitiveness of Indian MSEs during the post COVID-19 environment.

Figure 4. Structural Model of Logistics Strategy



Chisquare=234.581, p-value=.000, GFI=.938, CFI=.951, RMSEA=.040

7. Discussions

Supply chain management involves all parties that directly or indirectly fulfill a customer request. Organizations are interdependent and work in collaborative ways to improve efficiency of global logistics. This requires effective coordination. B&D typology has provided an empirically developed framework for logistics strategy using three orientations. The literature also provides evidence that the impact of the overall logistics strategy gets magnified when the relationship is mediated by logistics coordination and effective customer service. However, recent studies showed a non-significant influence of customer service commitment during the COVID-19 period. This study suggests that once the uncertain conditions created by the pandemic have stabilized the effects of the overall logistics strategy on firm competitiveness would exist due to the logistics coordination and customer service commitments. Our results showed that all conceptualized relationships were significant for the micro and small enterprises in India and logistics coordination and customer service commitment mediated the relationship between firm competitive response and the overall logistic strategy. When coordination is effectively implemented then the other components of management generally follow along and have a positive impact on the delivery of services to the customers. The results of the study provide valuable insights into logistics strategies impact business competitiveness among Indian MSEs. All together the results indicate that these logistic strategies positively influenced the competitiveness of

Indian MSEs during the post COVID-19 environment. These results provide more additional empirical evidence that the B&D typology is appropriate and reliable in an emerging economy.

8. Implications

B&D typology is one of the frameworks available in the literature for examining the role of logistics strategy on firm competitiveness. The conceptual foundations of this framework are well-grounded in literature and previous studies provide strong empirical support for the B-D framework of logistics taxonomy. This implies that the B&D logistics strategy model is a culturally robust conceptual framework that helps our understanding of the role of logistics strategy and how it contributes to firm competitiveness. Moreover, this study also fulfills a gap in the literature by providing empirical evidence on the model's effectiveness in the post-pandemic environment. We argue that there is sufficient empirical evidence about its validity and effectiveness in influencing firm competitiveness in unlike business environments, hence using the B&D typology to analyze logistics approaches in various nations could be valuable.

For the MSEs, the foundation of the company's business model is based on their relationship with the customers. As such, logistics as a whole is of utmost importance to MSEs (Burt, Petcavage and Pinkerton, 2010). Logistics addresses the source of funding and the purpose of being in business, which is to produce and make money by meeting consumers' demands (Krajewski, Ritzman & Malhotra, 2010). In order to obtain competitive advantage, logistics methods also provide ongoing customer relationship improvement (Chen, 1999). The MSEs' dedication to clients and profitability are determined by how they carry out a logistics plan. Because it may create or break client connections, logistics is crucial for all businesses (Cant, Strydom, Jooste & Du Plessis, 2006). The most significant advantages that MSEs experience from implementing logistics strategies are increases in competitive advantage, greater sales, and a decrease in operational costs. MSEs could engage in ongoing training and development initiatives to improve their workforce's logistical skills. If put into practice, these tactics will help MSEs effectively cope with persistent issues that arise during the execution of logistics plans.

For researchers, the B&D typology appears to be one framework that can be useful when conducting comparative logistics research. The authors believe that this typology could be a useful tool for understanding logistics strategies in different countries. Further research should continue to assess the value of the B&D typology for comparative logistics research and examine differences, and the cause of differences, of logistics strategies between countries or economies.

9. Conclusion

This study achieved its objective of better understanding of logistic strategy framework in the post-COVID era. The results of the analyses in this manuscript provide insight into logistics strategy. In addition, we conclude that the results obtained in this study is consistent with the previous conclusions made in the literature with respect to the B&D

model's validity in different business environments—that is, the logistics strategies contribute to firm competitiveness through the logistics coordination and customer service commitment.

10. References

- Agility Emerging Markets Logistics Index (2022). Available at <https://www.agility.com/en/emerging-markets-logistics-index/>. Accessed September 2023.
- Attia, A. (2014), Testing Bowersox and Daugherty typology in Egypt: An empirical Study on the Pharmaceutical Industry, *International Journal of business Performance and Supply Chain Modelling*, Vol. 6 No. 3/4, pp. 228-238.
- Arshinder, A. K. and Deshmukh, S. G. (2007), Coordination in supply chains: an evaluation using fuzzy logic, *Production Planning & Control*, Vol. 18 No. 5, pp. 420-435, DOI: 10.1080/09537280701430994.
- Bernardi, R.A. (1994), Validating Research Results when Cronbach's Alpha is below 0.70: A Methodological Procedure, *Educational and Psychological Measurement*, Vol. 54 No. 3, pp. 766-775.
- Bowersox, D. J., and Daugherty, P.J. (1987), Emerging Patterns of Logistical Organization, *Journal of Business Logistics*, Vol. 8 No. 1, pp. 46-60.
- Burt, D., Petcavage, S. and Pinkerton, R. (2010), *Supply management*. 8th ed. Boston: McGraw-Hill.
- Butt, A.S. (2021), Supply chains and COVID-19: impacts, countermeasures and post-COVID-19 era, *The International Journal of Logistics Management*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/IJLM-02-2021-0114>, Accessed 12/19/2022.
- Clinton, S.R., and Closs, D.J. (1997), Logistics Strategy: Does it Exist? *Journal of Business Logistics*, Vol. 18 No. 1, pp. 19-44.
- Casaca, A., Paixao, C., and Marlow, P.B. (2009), Logistics strategies for short sea shipping operating as part of multimodal transport chains, *Maritime Policy, and Management*, Vol. 36 No. 1, pp. 1-19.
- Cant, M.C., Strydom, J.W., Jooste, C.I., and Du Plessis, P.J. (2006). *Marketing management*. 4th ed. Cape Town: Juta & Co.
- Chen, W.H. (1999), The manufacturing strategy and competitive priority of SMEs in Taiwan: A case surveys, *Asia Pacific Journal of Management*, Vol. 16, pp. 331-349.
- Fonseca, L. and Azevedo, A.L. (2020), COVID-19: Outcomes for Global Supply Chains, *Management and Marketing, Challenges for Knowledge Society*, Vol. 15 No. Special Issue, pp. 424-438. DOI: 10.2478/mmcks-2020-0025.
- Gurumurthy, A., Soni, G., Prakash, S. and Badhotiya, G.K. (2013), Review on Supply Chain Management Research—An Indian Perspective, *IIM Kozhikode Society & Management Review*, Vol. 2 No. 1, pp. 1-19.
- Heskett, J. L. (1977), Logistics: Essential to Strategy, *Harvard Business Review*, Vol. 55 No. 6, pp. 85-95.
- Kara, A., Spillan, J.E., Acikdilli, G., and Kirkbesoglu, E. (2023), Re-evaluation of Logistics Strategy and Firm Performance During COVID-19 Pandemic Environment: Reduced Customer Service Commitment, *Supply Chain Forum: An International Journal*. doi: 10.1080/16258312.2023.2253522.
- Keller, S.B., Savitskie, K., Stank, T.P., Lynch, D.F., and Ellinger, A.E. (2002), A Summary and Analysis of Multi-Item Scales Used in Logistics Research" *Journal of Business Logistics*, Vol. 23 No. 2, pp. 83-119.
- Kohn, J.W. and McGinnis, M.A. (1997a), Logistics Strategy: A Longitudinal Study, *Journal of Business Logistics*, Vol. 18 No. 2, pp. 1-14.

- Kohn, J. W. and McGinnis, M. A. (1997b), Advanced Logistics Organization Structures: Revisited, *Journal of Business Logistics*, Vol.18 No. 2, pp. 147-162.
- Kohn, J.W., McGinnis, M.A., and Kara, A. (2011), A Structural Equation Model Assessment of Logistics Strategy, *The Journal of International Logistics Management*, Vol. 22 No. 3, pp. 284-305.
- Krajewski, L. J., Ritzman, L. P. & Malhotra, M. K. (2010), *Operations management. Processes and supply chains*. 9th ed. New York: Pearson.
- Luo, W., Van Hoek, R.I. and Ross, H.H. (2001), Cross-Cultural Logistics Research: A Literature Review and Propositions, *International Journal of Logistics Research and Applications*, Vol. 4 No. 1, pp. 57-78.
- Mafini, C. and Omoruyi, O. (2013), Logistics benefits and challenges: The case of SMEs in a South African local municipality, *The Southern African Journal of Entrepreneurship and Small Business Management*, Vol. 6 No. 1, pp. 145-167.
- Mellat-Parast, M. and Spillan, J. E. (2014), Logistics and supply chain process integration as a source of competitive advantage: An empirical analysis, *The International Journal of Logistics Management*, Vol. 25 No. 2, pp. 289-314.
- McGinnis, M.A., and Kohn, J.W. and Myers, M.D. (1990)/ Private Warehouse Investment Strategies. *Transportation Journal* 29(4), 11-17.
- McGinnis, M.A., and Kohn, J.W. (1993), Logistics Strategy, Organizational Environment, and Time Competitiveness, *Journal of Business Logistics*, Vol. 14 No. 2, pp. 1-23.
- McGinnis, M.A., and Kohn, J.W. (2002), Logistics Strategy – Revisited, *Journal of Business Logistics*, Vol. 23 No. 2, pp. 1-17.
- McGinnis, M.A., Kohn, J.W. and Spillan, J.E. (2010), A Longitudinal Study of Logistics Strategy: 1990-2008, *Journal of Business Logistics*, Vol. 31 No. 1, pp. 217-235.
- McGinnis, M.A., Harcar, T., Kara, A., and Spillan, J.E. (2011), Cross-Cultural Validation of the Factorial Structure of a Logistics Strategy Model: A Three-Country Study, *Journal of Transportation Management*, Vol. 22 No. 2, pp. 25-43.
- McGinnis, M.A., Spillan, J.E., and Virzi, N. (2012a), An Empirical Study Comparing Guatemalan and United States Logistics Strategies, *The International Journal of Logistics Management*, Vol. 23 No. 1, pp. 77-96.
- McGinnis, M.A., Spillan, J.E., Kara, A., and King, D.O. (2012b), A Comparison of Logistics Strategy and Logistics Integration in the USA and Ghana, *Journal of Transportation Management*, Vol. 22 No. 1, pp. 27-43.
- McGinnis, M.A., Kara, A., and Spillan (2013), The Empirical Cross-Cultural Assessment of a Logistics/Supply Chain Management Typology, *Journal of Transportation Management*, Vol. 24 No. 1, pp. 77-94.
- McMaster, M., Nettleton, C., Tom, C., Xu, B., Cao, C., & Qiao, P. (2020), Risk management: Rethinking fashion supply chain management for multinational corporations in light of the COVID-19 outbreak, *Journal of Risk and Financial Management*, Vol. 13 No. 8, pp. 173. <https://doi.org/10.3390/jrfm13080173>.
- Meyer, A., Walter, W. and Seuring, S. (2021), The Impact of the Coronavirus Pandemic on Supply Chains and Their Sustainability: A Text Mining Approach, *Frontiers in Sustainability*, Vol. 2, pp. 631182.
- Schmitt, N. (1996), Uses and Abuses of Coefficient Alpha, *Psychological Assessment*, Vol. 8 No. 4, pp. 350-353.
- Spillan, J.E., McGinnis, M.A., Kara, A., and Liu Yi, G. (2013), A Comparison of the Effect of Logistics Strategy and Logistics Integration on Firm Competitiveness in the USA and China, *International Journal of Logistics Management*, Vol. 24 No. 2, pp. 153-179.

- The Hindu business line-Companies/Markets/Portfolio/Economy/Opinion
<https://www.thehindubusinessline.com/opinion/logistics-and-supply-chain-trends-for-2021/article36366467.ece>
- Transglobe (2021). What is Future of Supply Chain in India,
<https://www.transglobeacademy.com/what-is-future-of-supply-chain-management-in-india/>
accessed 12/19/2022.
- Pereira, Sandeep (2021), Demand of Supply Chain Management in India: Why Pursue Supply Chain Management? <https://www.upgrad.com/blog/demand-of-supply-chain-management/>
- World Economic Forum (2013), "Global Competitiveness Report 2009-2010. Geneva (2013).